

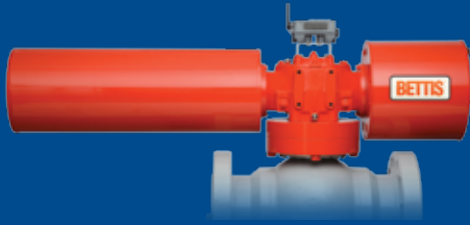
# G-Series Pneumatic and Hydraulic Actuators

## The Latest Generation in Valve Automation Solutions



**BETTIS™**

  
**EMERSON™**  
Process Management



Bettis G-Series  
with Wireless Transmitter

Emerson Process Management – Valve Automation sets the standards for innovation and quality in pneumatic and hydraulic valve automation.

Bettis G-Series actuators are lightweight, efficient and reliable - all in a compact, modular package.

G-Series are available with either symmetric or canted yokes to suit your operating requirements.



Bettis G-Series  
with Topworx Positioner

## Design and Construction

Emerson Process Management- Valve Automation has been the pioneer in valve actuation innovation for more than 55 years. The broad product offering, high quality standards and a proven performance track record, make us the perfect choice for reliable valve automation. A wide range of industries, including the oil and gas, chemical, refining, pulp & paper, water & wastewater, power generation, nuclear and other industries all rely on Emerson's Bettis brand.

G-Series pneumatic and hydraulic actuators provide global customers with the latest in valve actuation design. It is a highly unique and reliable means of operating ball, butterfly or plug valves along with louvers, dampers and other 90 degree rotating mechanisms. G-Series actuators are back by a five-year materials and workmanship warranty, the best in the industry.

### G-SERIES SERIES APPLICATION AND FEATURES

- The actuators are PED 97/23/EC compliant to meet the stringent requirements of pressure mounting vessels.
- G-Series actuators meet both IP66 and IP67M specifications for submergence and high pressure water deluge test. This offers superior water ingress and corrosion protection.
- The actuator has suitability for use within the demanding applications of a SIL environment.
- G-Series is available in both spring-return or double-acting configurations and can operate with either a symmetric or canted yoke.
- G-Series offers multiple configurations, with a modular design that enables safe field maintenance and reduced inventory costs.
- The actuator optimizes the center of gravity location to be lighter and more compact than other actuators of equal torque output – 1/3 lighter and 1/2 smaller.
- G-Series has interchangeable power and spring modules for quick reversal of the fail-safe mode.
- 5-Year Warranty.



## Operating Ranges

G-Series has guaranteed torque outputs for spring-return models in excess of 3,000,000 lb-in (339,000 Nm) and double-acting 12,581 – 6,000,000 lb-in (1420 – 678,000 Nm) .

Operating pressures are:

Pneumatic – 40-220 psig (3-14 Bar)

Hydraulic – to 5,000 psig (345 Bar)

Operating temperatures standard and high cycle (-33 trim) are -20° F to +200° F (-29° C to +93° C).

Optional trims include:

High Temperature (-10 trim) 0° F to +350° F (-18° C to +177° C)

Low Temperature (-11 trim) -40° F to +150° F (-40° C to +66° C)

**Note:** Low Temperature trim is non PED

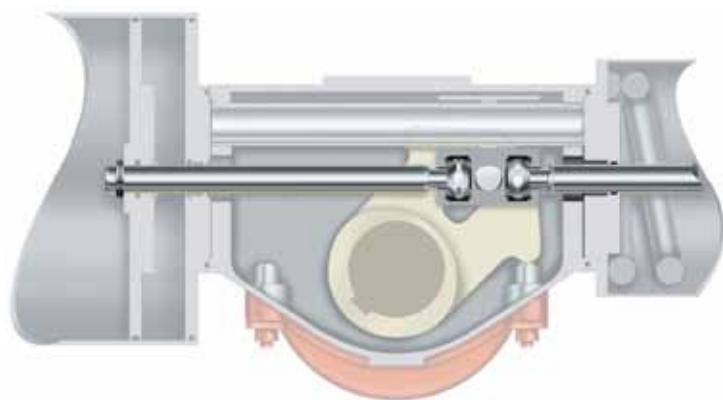
Non-PED low temperature

Pneumatic: -50° F to +180° F (-46° C to +82° C)

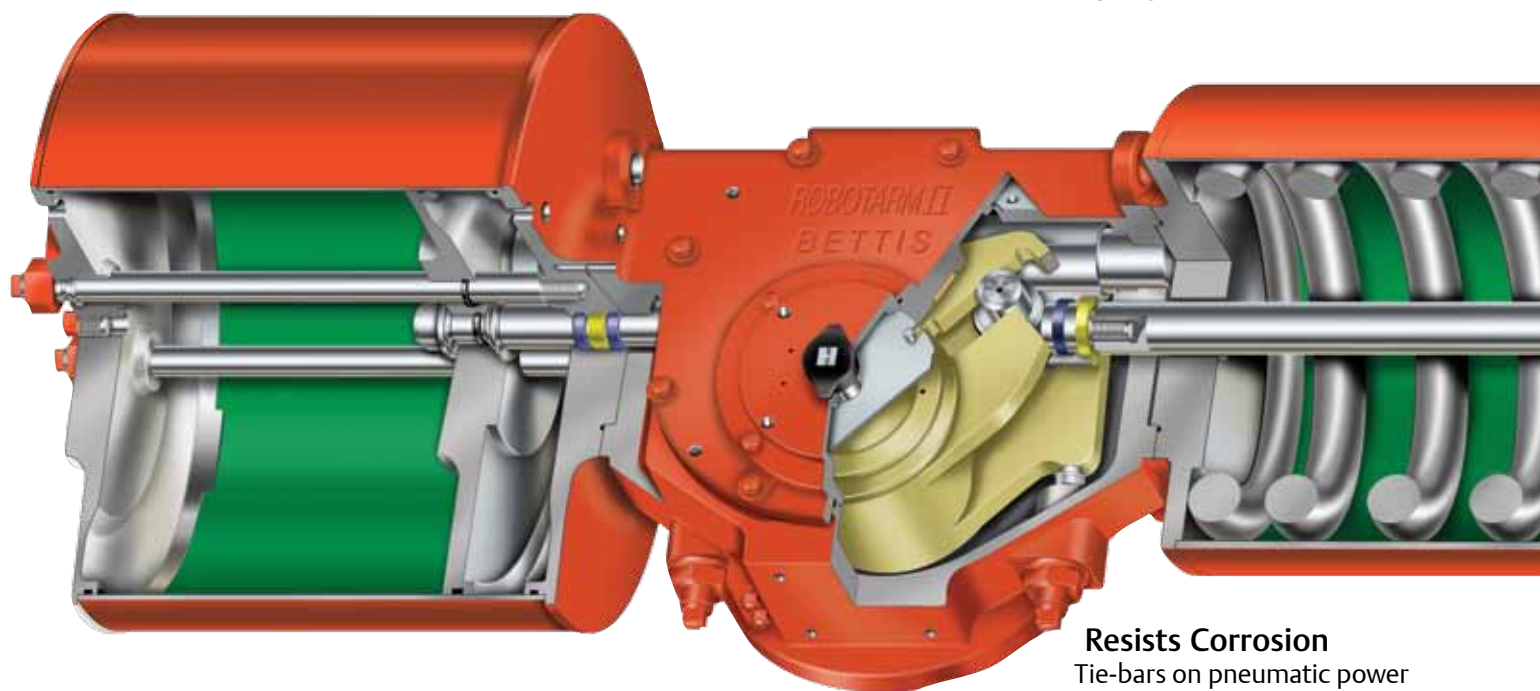
Hydraulic : -50° F to +200° F (-46° C to +93° C)

## Reduces Wear

The Power-Swivel™ piston rod and guide block connection compensates for side load deflection and reduces wear. Seal-lubricating bearings protect sliding and rotating components.

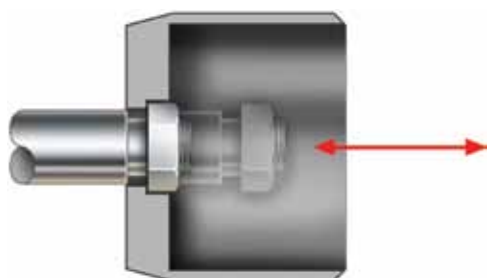


Power-Swivel™



## Promotes Safety

The patented Tension-Lok™ device positively locks the spring module to allow its safe removal and installation, eliminating accidental release of the spring force.



Tension-Lok™

## Resists Corrosion

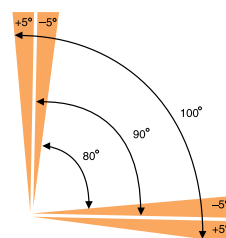
Tie-bars on pneumatic power modules are corrosion resistant, and internal and external surfaces are coated to protect in harsh environments.

## Seals Positively

With dual drive module vent checks, breather seals, total O-ring sealing and no gaskets, the G-Series prevents water ingress and seals out the environment.

## Bi-Directional Travel Stops

Integral bi-directional travel stops, adjustable from 80° to 100° of total valve travel, assist the G-Series in prolonging valve seat integrity.





## Other G-Series Solutions

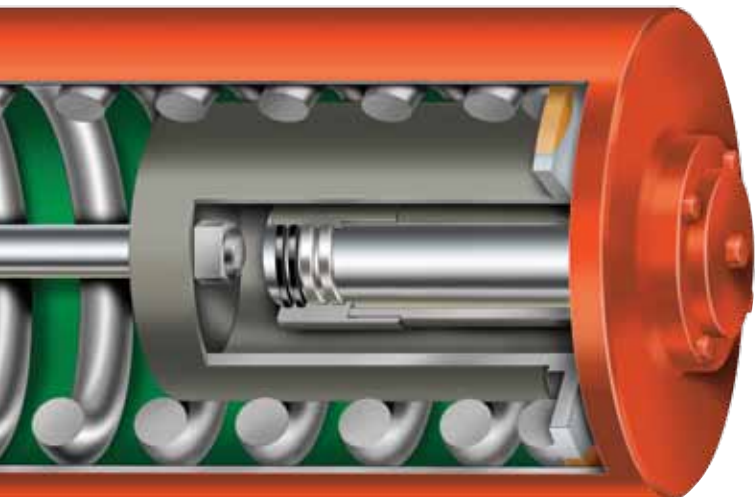
### GS-Series

Bettis actuators have long been a preferred brand for use in marine environments. The GS-Series actuators are well suited for splash zone, riser and other offshore fail-safe applications. They are available with diver or ROV intervention systems.



### NG-Series

Bettis actuators were perhaps the first ever qualified for nuclear service, meeting IEEE 382 standards more than 40 years ago. NG-Series actuators have been independently tested to include LOCA (Loss of Cooling Accident), seismic, and various aging processes required to meet current nuclear qualification criteria.



### GH-Series

The GH-Series actuators provide specialized higher maximum operating pressures (MOP) where required. Available in either canted (model GHC) or symmetric (GH) yoke configurations for spring-return, fail-safe projects. An optional SR0 spring is available for higher spring start and end torques.

### Safety Integrity Level (SIL)

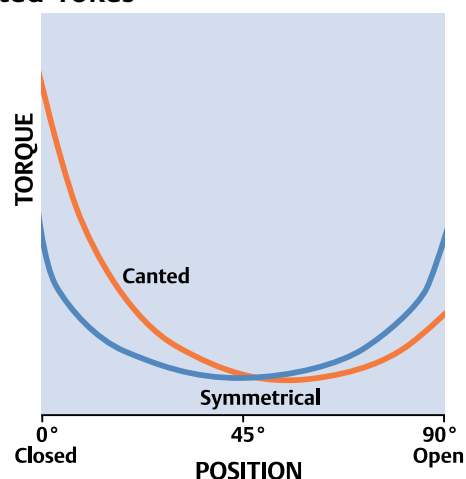
Bettis G-Series actuators are used within demanding SIL applications. They have a Failure Modes and Effects Diagnosis Analysis (FMEDA) report performed by Exica.com for SIL suitability. With the addition of Fisher's TÜV-certified FIELDVUE™ controller, the G-Series can be partial stroke tested and continuously monitored to verify its proper working condition, making it suitable for controlling final control elements in SIL 1,2 or 3 applications.

### Jackscrew is available for the G1, G2, and G3

Bettis offers a variety of mechanical and manual overrides for G-Series models. The M11 hydraulic override can be used with either spring-return pneumatic or hydraulic models. The M3 jackscrew manual override for G1, G2, and G3 models is available with or without handwheel.

### Symmetric or Canted Yokes

Bettis G-Series actuators are available with either symmetric or canted yokes. The traditional symmetric yokes provide efficient operation at both the break and end positions. Canted (or inclined) yokes have a torque advantage in applications where higher break torque is needed to unseat the valve, with less critical needs at the run or full open positions.



Symmetric Yoke



Canted Yoke

### Emerson brands for most common control accessories:

<b>Digital Valve Controllers:</b>	Fisher®
<b>Positioners:</b>	Fisher®
<b>Regulators:</b>	Fisher®
<b>Switch boxes:</b>	TopWorx
<b>Wireless position monitor:</b>	TopWorx
<b>Solenoid valves:</b>	ASCO Numatics™

For more detailed technical information see our online documentation under [www.Bettis.com/technical-data](http://www.Bettis.com/technical-data)

## Options

### Overrides

Bettis offers a variety of mechanical and manual overrides for G-Series models. The M11 hydraulic override can be used with either spring-return pneumatic or hydraulic models. The M3 jackscrew manual override for G1, G2 and G3 models is available with or without handwheel. The G-Ride (shown) is an economical external non-declutchable mechanical override for G4 and G5 spring-return models available with standard hex nut or handwheel.



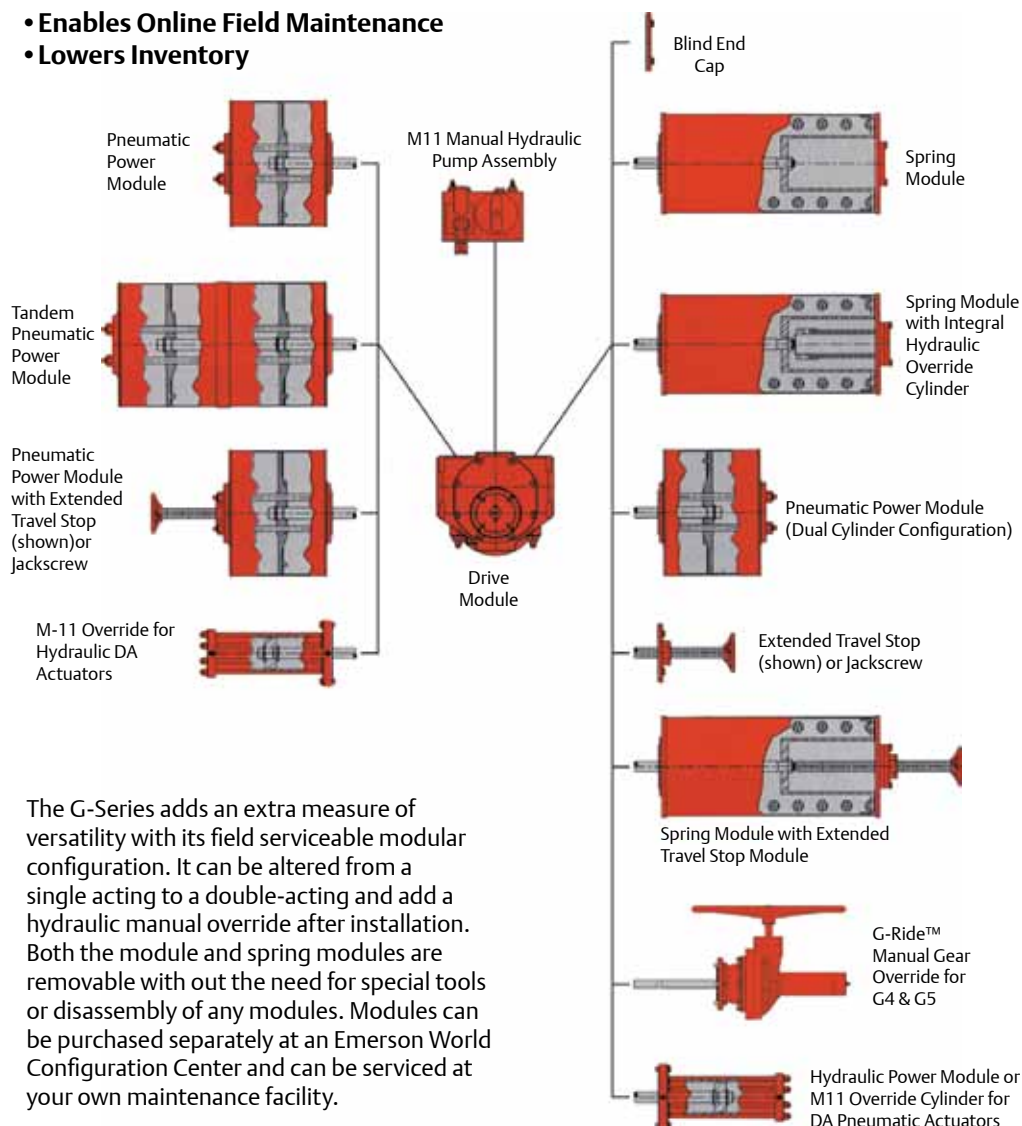
### Automated Packages

Bettis offers complete valve operating systems for final valve control. At our World Area Configuration Centers (WACC), we combine the G-Series actuator, controls and a valve in a single system. We can integrate a complete controls offering including world-class PlantWeb® digital plant architecture. We also supply BettiSystems™, pre-engineered and documented controls packages, available at our WACC for reducing lead times, simplifying purchasing and easing installation.



## Modular Versatility

- Enables Online Field Maintenance
- Lowers Inventory



The G-Series adds an extra measure of versatility with its field serviceable modular configuration. It can be altered from a single acting to a double-acting and add a hydraulic manual override after installation. Both the module and spring modules are removable with out the need for special tools or disassembly of any modules. Modules can be purchased separately at an Emerson World Configuration Center and can be serviced at your own maintenance facility.

**Note:** The above graphic does not necessarily depict all modular orientations. Consult Factory for certified dimensional drawings.

## STANDARDS AND CERTIFICATIONS

Bettis G-Series actuators are manufactured to meet the following worldwide quality and safety standards:



PED/97/23/EC –  
Pressure  
Equipment  
Directive

## **Bettis G-Series**

**Technical Data Pneumatic Actuators - Imperial** (metric unavailable)



## Data sheet

Sheet No.: GPI 1.05 RevB

Date: August 2010

# G-Series

## Torque Ratings – (Pneumatic)

All Published Torques are Guaranteed Minimum Values.

### Spring-Return Actuators

#### G-Series

Actuator Model	Spring Torque Start/Min./End (lb-in)	Operating Pressure (PSIG)									
		40	50	60	70	80	100	120	150	175	200
		Pressure Torque Output Start/Min./End (lb-in)									
G01008-SR4	Start	11614				5551	9706	13861	20093	25287	
	Min.	5708				2439	4648	6849	10138	12880	
	End	10015				3783	7938	12093	18326	23520	
G01009-SR4	Start	11614		4820	7469	10117	15414	20710	28655	35276	41897
	Min.	5708		2051	3459	4866	7669	10464	14657	18151	21646
	End	10015		3053	5701	8350	13646	18943	26888	33508	40129
G01010-SR4	Start	11614	6488	10000	13511	17023	24046	31069	41603		
	Min.	5708	2938	4804	6664	8518	12224	15931	21491		
	End	10015	4721	8232	11744	15255	22278	29301	39836		
G01012-SR4	Start	11614	9063	14096	19130	24163	29196	39262			
	Min.	5708	4306	6973	9630	12286	14943	20255			
	End	10015	7296	12329	17362	22395	27428	37495			
G01014-SR4	Start	11614	13413	19534	25654	31775	37895				
	Min.	5708	6613	9843	13073	16304	19534				
	End	10015	11646	17766	23887	30007	36128				
G01008-SR3	Start	13598					8126	12281	18513	23707	
	Min.	6605					3631	5839	9143	11884	
	End	11445					5746	9901	16134	21327	
G01009-SR3	Start	13598			5889	8537	13834	19130	27075	33696	40316
	Min.	6605			2437	3850	6665	9469	13662	17156	20650
	End	11445			3509	6157	11454	16751	24695	31316	37937
G01010-SR3	Start	13598	4908	8420	11931	15443	22466	29489	40023		
	Min.	6605	1904	3787	5653	7520	11229	14935	20495		
	End	11445	2529	6040	9552	13063	20086	27109	37643		
G01012-SR3	Start	13598	7483	12516	17550	22583	27616	37682			
	Min.	6605	3289	5964	8634	11291	13947	19260			
	End	11445	5104	10137	15170	20203	25236	35303			
G01014-SR3	Start	13598	11833	17954	24074	30195	36315				
	Min.	6605	5601	8848	12078	15308	18538				
	End	11445	9453	15574	21695	27815	33936				
Actuator Model	Spring Torque Start/Min./End (lb-in)	Pressure Torque Output Start/Min./End (lb-in)									
		40	50	60	70	80	100	120	150	175	200
		Operating Pressure (PSIG)									

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## Data sheet

Sheet No.: GPI 2.03 RevB

Date: August 2010

G-Series

# Performance Data – (Pneumatic)

## Spring-Return Actuators

### G-Series

Actuator Model	Volume Per Stroke (Cu.In.)▲	Maximum Operating Pressure (MOP)* (PSIG)	Approximate Weight of Actuator (Lbs.)
G01008-SR4	365	192	295
SR3	365	192	304
SR2	365	192	309
SR1	365	192	311
G01008-SR4	465	200	289
SR3	465	200	298
SR2	465	200	303
SR1	465	200	305
G01010-SR4	621	166	302
SR3	621	166	311
SR2	621	166	316
SR1	621	166	318
G01012-SR4	898	116	312
SR3	898	116	321
SR2	898	116	326
SR1	898	116	328
G01014-SR4	1096	97	325
SR3	1096	97	334
SR2	1096	97	339
SR1	1096	97	341
G2009-SR6	465	187	369
SR5	465	187	409
SR4	465	187	409
SR3	465	187	424
SR2	465	187	424
SR1	465	187	439
G2010-SR6	621	141	364
SR5	621	141	404
SR4	621	141	404
SR3	621	141	419
SR2	621	141	419
SR1	621	141	434
G2012-SR6	898	100	377
SR5	898	100	417
SR4	898	100	417
SR3	898	100	432
SR2	898	100	432
SR1	898	100	447
Actuator Model	Volume Per Stroke (Cu.In.)▲	Maximum Operating Pressure (MOP)* (PSIG)	Approximate Weight of Actuator (Lbs.)

Actuator Model	Volume Per Stroke (Cu.In.)▲	Maximum Operating Pressure (MOP)* (PSIG)	Approximate Weight of Actuator (Lbs.)
G2014-SR6	1096	81	387
SR5	1096	81	427
SR4	1096	81	427
SR3	1096	81	442
SR2	1096	81	442
SR1	1096	81	457
G2016-SR6	1443	61	424
SR5	1443	61	464
SR4	1443	61	464
SR3	1443	61	479
SR2	1443	61	479
SR1	1443	61	494
G3010-SR4	751	200	554
SR3	751	200	568
SR2	751	200	584
SR1	751	200	588
G3012-SR4	1093	142	570
SR3	1093	142	584
SR2	1093	142	600
SR1	1093	142	604
G3014-SR4	1337	117	580
SR3	1337	117	594
SR2	1337	117	610
SR1	1337	117	614
G3016-SR4	1736	90	611
SR3	1736	90	625
SR2	1736	90	641
SR1	1736	90	645
G3020-SR4	2940	56	675
SR3	2940	56	689
SR2	2940	56	705
SR1	2940	56	709
G4012-SR4	1281	200	883
SR3	1281	200	943
SR2	1281	200	959
G4014-SR4	1561	194	895
SR3	1561	194	954
SR2	1561	194	970
SR1	1561	194	980
Actuator Model	Volume Per Stroke (Cu.In.)▲	Maximum Operating Pressure (MOP)* (PSIG)	Approximate Weight of Actuator (Lbs.)

▲ Maximum volume including cavity required for calculating consumption per stroke.

\* **Maximum Operating Pressure (MOP)** – The maximum recommended pressure at which the actuator should be operated.

**Maximum Relief Valve Set Pressure (MRP)** – The maximum recommended relief pressure value set point.

MRP is calculated by multiplying MOP times 1.15 for G-Series actuators.

**Maximum System Pressure (MSP)** – The maximum allowable system supply pressure to which an actuator may be exposed. MSP is calculated by multiplying MOP times 1.25 for G-Series actuators.

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## Data sheet

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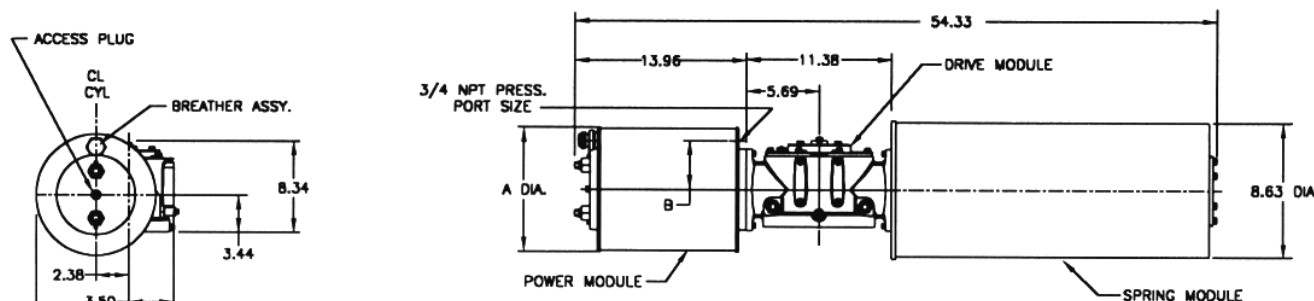
Date: August 2010

G-Series

# Dimensions – (Pneumatic) In.

## Spring-Return Actuators

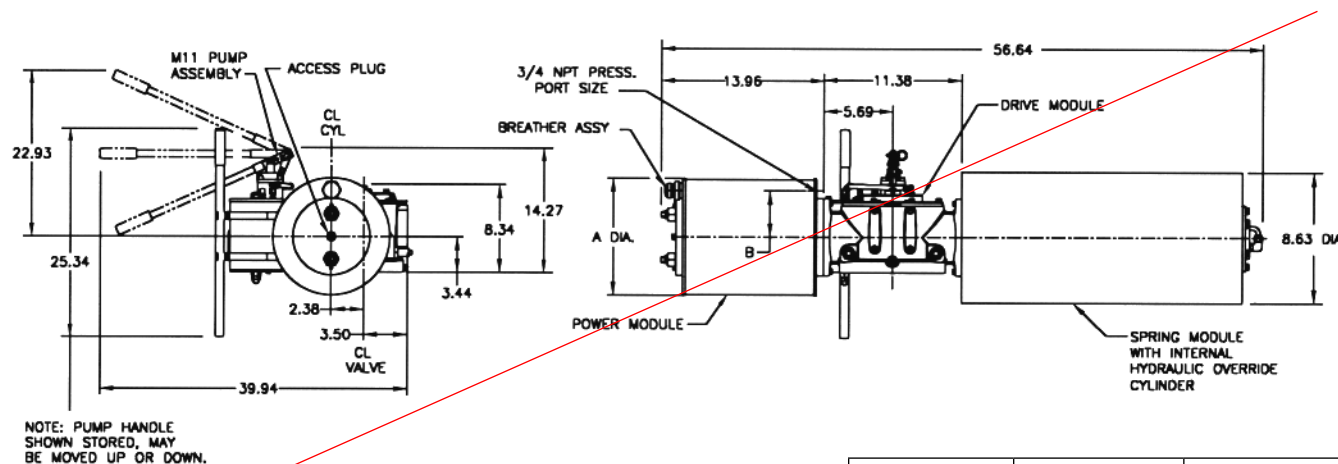
G010XX-SR (CW Model Shown)



➔

Actuator Model	A	B	C
G01008-SR	8.75	3.19	10.25
G01009-SR	9.88	3.78	10.82
G01010-SR	11.00	4.38	11.38
G01012-SR	13.00	5.00	12.38
G01014-SR	14.25	5.50	13.00

## G010XX-SR-M11 (CW Model Shown)



Actuator Model	A	B
G01008-SR-M11	8.75	3.25
G01009-SR-M11	9.88	3.78
G01010-SR-M11	11.00	4.38
G01012-SR-M11	13.00	5.00
G01014-SR-M11	14.25	5.50

Note: Not Certified dimensional drawings. Such drawings available on request.  
Contact factory with correct model designation and serial number.  
All dimensions are expressed in inches.

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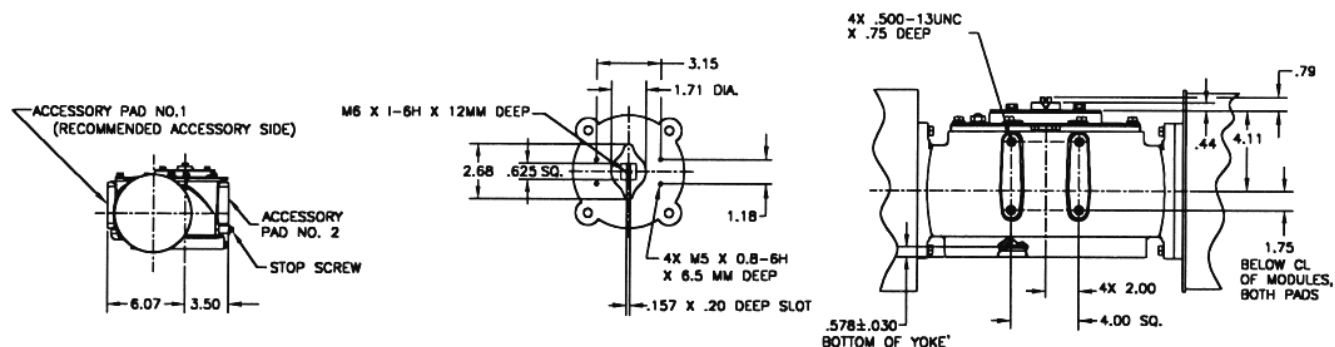
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G-Series

# Dimensions – (Pneumatic) In.

## Spring-Return Actuators

### Accessory Details



ACCESSORY PAD NO.1 DETAIL

Note: Not Certified dimensional drawings. Such drawings available on request.

Contact factory with correct model designation and serial number.

All dimensions are expressed in inches.

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